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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/650,461	08/27/2003	David Dawes	9140.0025	7106

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EXAMINER
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DUPUIS, DEREK L

ART UNIT	PAPER NUMBER
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2883

DATE MAILED: 03/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/650,461

Applicant(s)

DAWES, DAVID

Examiner

Derek L. Dupuis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 3-20 is/are pending in the application.
- 4a) Of the above claim(s) 15-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-14 is/are rejected.
- 7) ☒ Claim(s) 1 and 3-14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 July 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/3/2006 has been entered.

### ***Response to Arguments***

2. Applicant's arguments with respect to claims 1-14 have been considered but are moot in view of the new ground(s) of rejection.

3. Currently, claim 2 is cancelled and claims 1 and 3-20 are pending in the case. Claims 15-20 were previously withdrawn. Claims 1 and 3-14 have been examined.

### ***Claim Objections***

4. Claims 1 and 3-14 are objected to because they are indefinite.

5. Claim 1 recites the limitation "highly amorphous" and "high refractive index contrast" which are indefinite because they do not clearly define the metes and bounds of the claim. Claims 3 and 4 also include the limitation "highly transparent" and "high surface smoothness" respectively. Claim 7 includes the limitation "high refractive index active waveguide" and "intermediate refractive index passive cladding." Claims 3-14 are dependent upon at least claim 1 and are therefore also indefinite.

6. The limitations "high," "highly," and "intermediate" are indefinite because it is unclear what would qualify as "high" or "intermediate." For example, would a refractive index contrast

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of 0.5 be considered high? It would be considered high when compared against a contrast of 0.1. When compared against a contrast of 1.5 it could also be considered low. Applicant must clearly set forth the measure and scope of the claimed limitations by clearly stating the value (or range of values) for the claimed characteristics.

7. For the purpose of examination, the examiner has indicated in the rejection what values he has considered to be "high" when applying the prior art.

### ***Product By Process Claims***

8. Claims 1-14 are **product-by-process claims**:

Note that a "product by process" claim is directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also *In re Thorpe*, 227 USPQ 964, 966; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and *In re Marosi et al.*, 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear. See also MPEP 2113.

3-20-66 JHJ  
9. Claims 1 and 3-14 do not distinguish over the prior art of record regardless of the process used to create the slab waveguide, because only the final product is relevant, <sup>for patentability</sup> and not the process of making such as DC-biased plasma vapor deposition.

### ***Claim Rejections - 35 USC § 102***

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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11. Claims 1, 3, 7, and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by *Cocorullo et al* ("*Amorphous silicon waveguides and light modulators for integrated photonics realized by low-temperature plasma-enhanced chemical-vapor deposition*").

12. Cocorullo et al teach an optical waveguide device comprising at least one highly amorphous film-based high refractive index contrast slab waveguide (see abstract and paragraphs 2, 5, and 14). The refractive index contrast is 0.40 which the examiner has considered to be "high." The slab waveguide is also highly transparent (see paragraph 6) as its absorption coefficient is less than  $0.1 \text{ cm}^{-1}$  which means the transparency is 'high'. The waveguide is coupled to receive light from at least one laser diode (see paragraph 7). As seen in figure 1 and table 1, the waveguide has a high refractive index active waveguide and an intermediate refractive index passive cladding. The active waveguide has a refractive index of 3.4 and the cladding has an index of 3.0 which the examiner considers an "intermediate" index relative to the 3.4 index core. The cladding is thick enough such that a substantial amount of the light from the diode is coupled into the cladding of the waveguide (see paragraph 8). Cocorullo et al teach that the waveguide can be formed by plasma enhanced vapor deposition (see abstract and paragraphs 2, 4, and 14).

### ***Claim Rejections - 35 USC § 103***

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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14. Claims 1 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Demaray et al (US 6,533,907 B2)*.

Demaray et al teach a high refractive index contrast slab waveguide that is highly amorphous (see abstract and column 9, lines 9-34). The waveguide is formed using DC-biased plasma vapor deposition (see column 2 line 37 to column 3, line 3). The resultant waveguide has a high surface smoothness. Demaray et al teach that the surface roughness is less than 7.5 angstroms which the examiner considers to be indicative of a 'high' smoothness. Demaray et al teach that the waveguide can be coupled to a light source to receive signal light and pump light (see column 10, lines 30-47). However, Demaray et al do not explicitly state the light source is a laser diode. It would have been obvious to one of ordinary skill in the art to use a laser diode to emit signal light or pump light since it is routine in the art to use laser diodes for this purpose.

15. Claims 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Cocorullo et al* as applied to claims 1, 3, 7, and 9 above, and further in view of *Beach ("Theory and optimization of lens ducts")*.

16. Cocorullo et al teach an optical waveguide device as discussed above in reference to claim 1. Cocorullo et al do not teach that the slab waveguide includes a lens duct. Beach teaches a waveguide device with a lens duct to couple light from a diode into a waveguide. It would have been obvious to one of ordinary skill in the art at the time of invention to use a lens duct as taught by Beach in the waveguide device as taught by Cocorullo et al for the purpose of "amplifying the irradiance of laser diode sources" (see abstract of Beach).

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17. Claims 6, 10, 12, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Cocorullo et al* as applied to claims 1, 3, 7, and 9 above, and further in view of *Medin et al (US 6,760,520 B1)*.

18. Cocorullo et al teach an optical waveguide device as discussed above in reference to claim 1. Cocorullo et al do not teach that the waveguide includes a mode-size converter or a reverse tapered region. However, Medin et al teach a mode size converter with a reverse tapered region for use in an optical waveguide device. Medin et al also teach that the mode size converter can be used in an array with an array of laser diodes and waveguides (see column 10, line 53 to column 11, line 14). It would have been obvious to one of ordinary skill in the art at the time of invention to use the mode-size converter taught by Medin et al in the optical waveguide device of Cocorullo et al for the purpose of improving optical coupling between a waveguide and a light emitting device (see abstract).

19. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Cocorullo et al* as applied to claims 1, 3, 7, and 9 above, and further in view of *Hubner et al ("Planar Er- and Yb-Doped Amplifiers and Lasers")*.

20. Cocorullo et al teach an optical waveguide device as discussed above in reference to claim 7. Cocorullo et al do not teach that the slab waveguide is folded in the plane of the slab. Hubner et al teach an optical waveguide device shown in figure 2a with a slab waveguide that is folded in the plane of the slab. It would have been obvious to one of ordinary skill in the art at the time of invention to modify the slab waveguide taught by Cocorullo et al by folding it as taught by Hubner for the purpose of increasing the amplification of the waveguide. The longer the waveguide, the greater the gain. Hubner teaches that by "curling" the waveguide within an

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area, then a longer waveguide can be used thereby increasing the amplification of the device (see the bottom paragraph of page 72).

21. Claims 11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Cocorullo et al* as applied to claims 1, 3, 7, and 9 above, and further in view of *Henrichs (US 2003/0185266 A1)*.

22. Cocorullo et al teach an optical waveguide device as discussed above in reference to claim 1. Cocorullo et al also teach that the mode size of an optical beam transmitted through the waveguide slab is smaller than the mode size of an incident light beam (see paragraphs 8-10). The field of the optical mode decreases though the waveguide. Cocorullo et al do not teach that the diode could be a VCSEL. However, Henrichs shows that a VCSEL and a diode are equivalent structures known in the art and that they are both used in optical pumping. It would have been obvious to one of ordinary skill in the art at the time of invention to substitute a VCSEL for a laser emitting diode as a light source.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Derek L. Dupuis whose telephone number is (571) 272-3101. The examiner can normally be reached on Monday - Friday 8:30am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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